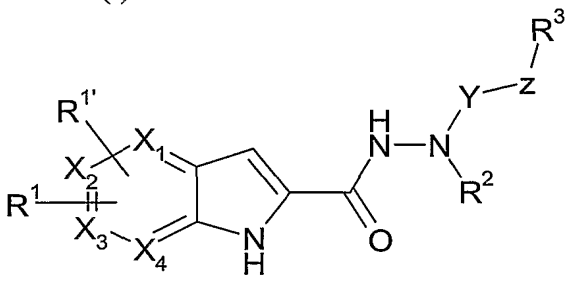
CLAIMS:

1. A compound of formula (I):



I

or a pharmaceutically acceptable salt thereof, wherein:

one of X_1, X_2, X_3 and X_4 is N and the others are C;

Y is -C(O)-, -$S(O)_2$-, or -C(NH)-;

Z is C_{1-4}alkylene, oxygen, -$(CH_2)_mO$-, -$O(CH_2)_m$-, -NR-, -$(CH_2)_mNR$-, -$NR(CH_2)_m$-, -$(CH_2)_mS(O)_2$-, or a bond;

m is 1, 2, 3, or 4;

R is C_{0-4}alkyl, C_{0-4}alkylaryl, or C_{0-4}alkylhetaryl;

R^1 and $R^{1'}$ are each independently, halogen, hydroxy, cyano, C_{0-4}alkyl, C_{1-4}alkoxy, fluoromethyl, difluoromethyl, trifluoromethyl, ethenyl, or ethynyl;

R^2 is C_{0-4}alkyl, $COOR^6$, COR^6, C_{1-4}alkoxyC_{1-4}alkyl–, hydroxyC_{1-4}alkyl–, cycloalkylC_{0-4}alkyl–, arylC_{0-4}alkyl–, or hetarylC_{0-4}alkyl–, wherein any of the aryl or hetaryl rings are optionally substituted with 1-2 independent halogen, cyano, C_{1-4}alkyl, C_{1-4}alkoxy, –N(C_{0-4}alkyl)(C_{0-4}alkyl), –SO_2C_{1-4}alkyl, –$SO_2N(C_{0-4}$alkyl)(C_{0-4}alkyl), hydroxy, fluoromethyl, difluoromethyl, or trifluoromethyl substituents;

R^3 is hydrogen, –$COOC_{0-4}$alkyl, C_{1-4}alkoxy, C_{1-4}alkyl, arylC_{1-4}alkylthio–, –C_{0-4}alkylaryl, –C_{0-4}alkylhetaryl, –C_{0-4}alkylcycloalkyl, or –C_{0-4}alkylheterocyclyl, wherein any of the rings is optionally substituted with 1-3 independent halogen, cyano, C_{1-4}alkyl, fluoromethyl, difluoromethyl, trifluoromethyl, –C_{0-4}alkylNHC(O)O(C_{1-4}alkyl), –C_{0-4}alkylNR^7R^8, –$C(O)R^9$, C_{1-4}alkoxyC_{0-4}alkyl–, –$COOC_{0-4}$alkyl, –C_{0-4}alkylNHC(O)R^9, –C_{0-4}alkylC(O)N(R^{10})$_2$, –C_{1-4}alkoxyC_{1-4}alkoxy, hydroxyC_{0-4}alkyl–, –$NHSO_2R^{10}$, –SO_2(C_{1-4}alkyl), –$SO_2NR^{11}R^{12}$, 5- to 6-membered heterocyclyl, phenylC_{0-2}alkoxy, or phenylC_{0-2}alkyl substituents, wherein phenyl is optionally substituted with 1-2 independent halogen, cyano, C_{1-4}alkyl, C_{1-4}alkoxy, –N(C_{0-4}alkyl)(C_{0-4}alkyl), –SO_2C_{1-4}alkyl, –$SO_2N(C_{0-4}$alkyl)(C_{0-4}alkyl), hydroxy, fluoromethyl, difluoromethyl, or trifluoromethyl substituents, or two bonds on a ring carbon of the heterocyclyl group optionally can form an oxo (=O) substituent;

or R^3 is –NR^4(–C_{0-4}alkylR^5);

R^4 is C_{0-3}alkyl, –C_{2-3}alkyl-NR^7R^8, C_{3-6}cycloalkyl optionally substituted by hydroxyC_{0-4}alkyl– further optionally substituted by hydroxy, C_{1-2}alkoxyC_{2-4}alkyl–, or C_{1-2}alkyl–$S(O)_n$–C_{2-3}alkyl–;

n is 0, 1, or 2;

R^5 is hydrogen, hydroxyC_{2-3}alkyl–, C_{1-2}alkoxyC_{0-4}alkyl–, or aryl, hetaryl, or heterocyclyl;

wherein a heterocyclic nitrogen-containing R^5 ring optionally is mono-substituted on the ring nitrogen with C_{1-4}alkyl, benzyl, benzoyl, C_{1-4}alkyl-C(O)–, $-SO_2C_{1-4}$alkyl, $-SO_2N(C_{0-4}alkyl)(C_{0-4}alkyl)$, C_{1-4}alkoxycarbonyl, or aryl(C_{1-4}alkoxy)carbonyl; and wherein the R^5 rings are optionally mono-substituted on a ring carbon with halogen, cyano, C_{1-4}alkyl–C(O)–, C_{1-4}alkyl–SO_2–, C_{1-4}alkyl, C_{1-4}alkoxy, hydroxy, $-N(C_{0-4}alkyl)(C_{0-4}alkyl)$, hydroxy$C_{0-4}$alkyl–, or C_{0-4}alkylcarbamoyl–, provided that no quaternised nitrogen is included; or two bonds on a ring carbon of the heterocyclyl group optionally can form an oxo (=O) substituent;

R^6 is C_{1-4}alkyl, aryl, or hetaryl;

R^7 and R^8 are independently C_{0-4}alkyl, C_{3-6}cycloalkyl, or $CO(C_{1-4}alkyl)$;

R^9 is C_{1-4}alkyl, or C_{3-6}cycloalkyl;

R^{10} is C_{0-4}alkyl, or C_{3-6}cycloalkyl; and

R^{11} and R^{12} are independently C_{0-4}alkyl or together with the nitrogen to which they are attached may form a 4- to 6-membered heterocycle;

provided there are no nitrogen-oxygen, nitrogen-nitrogen, oxygen-oxygen or nitrogen-halogen bonds in the grouping -Y-Z-R^3.

2. A compound according to claim 1, or a pharmaceutically acceptable salt thereof, wherein X_3 is N.

3. A compound according to claim 1, or a pharmaceutically acceptable salt thereof, wherein X_1 is N.

4. A compound according to any one of the preceding claims, or a pharmaceutically acceptable salt thereof, wherein Y is -C(O)- or $-S(O)_2$-.

5. A compound according to any one of the preceding claims, or a pharmaceutically acceptable salt thereof, wherein Z is C_{1-4}alkylene, oxygen, $-(CH_2)_mO$-, -NR- or a bond.

6. A compound according to any one of the preceding claims 1, or a pharmaceutically acceptable salt thereof, wherein R^1 and $R^{1'}$ are each independently, hydrogen or halogen.

7. A compound according to claim 6, or a pharmaceutically acceptable salt thereof, wherein one of R^1 and $R^{1'}$ is hydrogen and the other is 5-chloro.

8. A compound according to any one of the preceding claims, or a pharmaceutically acceptable salt thereof, wherein R^2 is hydrogen.

9. A compound according to any one of the preceding claims, or a pharmaceutically acceptable salt thereof, wherein R^3 is hydrogen, $-NR^4R^5$, $-NR^4(-C_{1-4}alkylR^5)$, aryl, hetaryl, or heterocyclyl wherein any of the rings is optionally substituted as defined in claim 1.

10. A compound of formula (I) as defined in any one of Examples 1 to 25, or a pharmaceutically acceptable salt thereof.

11. A pharmaceutical composition comprising a compound according to any one of claims 1 to 10, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

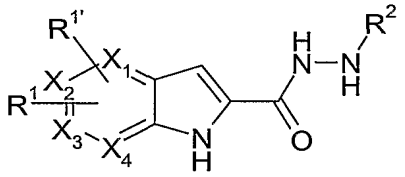
12. A method for the treatment of a disease or condition in which glycogen phosphorylase plays a role comprising a step of administering to a subject in need thereof an effective amount of a compound according to any one of claims 1 to 10, or a pharmaceutically acceptable salt thereof.

13. A method for the treatment of hyperglycemia or diabetes comprising a step of administering to a subject in need thereof an effective amount of a compound according to any one of claims 1 to 10, or a pharmaceutically acceptable salt thereof.

14. A method for the prevention of diabetes in a human demonstrating pre-diabetic hyperglycemia or impaired glucose tolerance comprising a step of administering to a subject in need thereof an effective prophylactic amount of a compound according to any one of claims 1 to 10, or a pharmaceutically acceptable salt thereof.

15. A method for the treatment of hypercholesterolemia, hyperinsulinemia, hyperlipidemia, hypertension, atherosclerosis or tissue ischemia, or achieving cardioprotection or inhibition of abnormal cell growth, comprising a step of administering to a subject in need thereof an effective amount of a compound according to any one of claims 1 to 10, or a pharmaceutically acceptable salt thereof.

16. A compound of formula (IV):



IV

wherein R^1, $R^{1'}$, R^2, X_1, X_2, X_3 and X_4 are as defined in claim 1, or a protected derivative thereof.